Without updating the technique, conventional gel electrophoresis is not able to separate results from large number of SNP such as more than 1000 or more than 10,000 SNP. This invention uses different color labeling combined with size-specified PCR products, which maximized the differentiation capability of gel electrophoresis. For example, each color of florescent labels 50 to 200 pairs of primers that designed for extending different size-specific products, a single 96-well PCR can detect up to 9,600 SNP sites for a single color. Given 4 or 10 different labeling methods are used, the power of detecting SNP will extend to 4 x 9600 or 10 x 9600.

In circumstance when florescent scanner is not available, radiolabeling combined with 96-well PCR reaction still works fine. The power is similar to the single color florescent labeling.

IV. Visualization and detection

Additional processes are only required for protocols using non-isotopic and non-fluorescent labeling. Labeled signal integrated into primer extended products can be detected using specific methods based on the labeling techniques. Examples of detection methods include those for non-isotopic labeled probes such as fluorescence measurement, light emission measurement, and calorimetric measurement; and those for isotopic labeled probes such as autoradiography and scintillation counting. These detection methods are well known to those of skill in the art familiar to the particular signal producing system employed

What is claimed is:

1). A method for high throughput assay of genetic analysis, comprising the steps of:
(a) preparing target specific primer sets;
(b) performing primer extension;
(c) distinguishing the extended products containing the labeled nucleotide from the extended products without labeled nucleotide and from non-extended primers; and
(d) detect the labeled product from primer extension left on the solid support.

2). The method according to claim 1, wherein said primer sets are paired primers.

3). The method according to claim 1, wherein said primer sets are unpaired primers.

4). The method according to claim 1, wherein said primer sets are unlabeled.

5). The method according to claim 1, wherein said primer is unmodified oligonucleotides.

6). The method according to claim 1, wherein said primer is modified oligonucleotides.

7). The method according to claim 1, wherein said primer is labeled at the 3' terminals.

8). The method according to claim 1, wherein said primer is labeled at more than one nucleotides.

9). The method according to claim 1, wherein said target specific primers sets are primers consisting of different subsets of primers with similar nucleotide sequences except at least having one mismatched nucleotide A, T, C, G respectively.

10). The method according to claim 9, wherein said target specific primer sets are immobilized on a solid support before primer extension.

11). The method according to claim 9, wherein said target specific primer sets are added into a liquid phase for primer extension.

12). The method according to claims 10, wherein said primer extension is solid phase primer extension.

13). The method according to claims 10, wherein said primer extension is cascade primer extension.

14). The method according to claims 10, wherein said primer extension is post-hybridization primer extension.

15). The method according to claim 1, wherein said primer extension is performed at 37 degree centigrade.

16). The method according to claim 1, wherein said primer extension is performed at temperature higher than 37 degree centigrade.

17). The method according to claim 1, wherein said primer extension is performed with DNA polymerase including DNA dependent DNA polymerase and RNA dependent DNA polymerase.

18). The method according to claim 1, wherein said primer extension is performed using unlabeled substrates of dNTPs.

19). The method according to claim 1, wherein said primer extension is performed using unlabeled dNTPs mixed with labeled nucleotides.

20). The method according to claim 1, wherein said extended product containing labeled nucleotide is separated from the un-extended primer using enzymatic treatment.

21). The method according to claim 1, wherein said extended product containing labeled nucleotide is mechanically separated from the un-extended primer.

22). The method according to claim 1, wherein said extended product containing labeled nucleotide is distinguished from the extended product without labeled nucleotide by visualization and detection.